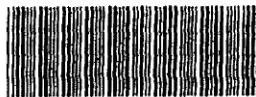


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Mar - 1987 EAC-420110-151

Rocky Flats Plant

Monthly Environmental Monitoring Report

Environmental Analysis and Control
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RR - RP - 00233



Rockwell International
Rocky Flats Plant
North American Space Operations
P O Box 464
Golden Colorado 80402-0464

A Prime Contractor to
The United States Department of Energy

Reviewed for Classification/UCNI/OUO
By: Janet Nesheim, Derivative Classifier
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MARCH 1987 ENVIRONMENTAL MONITORING REPORT
ROCKY FLATS PLANT

This report summarizes the effluent and environmental monitoring programs at the Rocky Flats Plant for the month of March, 1987.

Included in the report are monitoring results for radioactive and nonradioactive airborne effluents continuously sampled from Plant buildings, Tables I and II. Tables III through VI summarize environmental monitoring data from the Rocky Flats Plant ambient air sampling network. This network is comprised of continuously operating air samplers located on plantsite, around the Plant boundary, and in neighboring communities.

Water sampling results for radioactive constituents are given in Tables VII through IX. Results are summarized for Plant surface water control ponds, for nearby drinking water reservoirs, and for tap water for neighboring communities. Nitrate monitoring for Great Western Reservoir and Standley Lake, the two drinking water reservoirs which can receive surface water discharges from the Plant, are summarized in Table X.

The Environmental Protection Agency (EPA) has issued to the Plant a National Pollutant Discharge Elimination System (NPDES) permit for control of surface water discharges. Water sampling results associated with the NPDES permit, as well as applicable discharge limitations imposed by that permit, are reported in Table XI. Daily flow data for surface water from the two Plant drainage systems are given in Tables XII and XIII.

The Rocky Flats Plant Environmental Monitoring Program includes evaluating plant compliance with all relevant guides, limits, and standards. All average results of monitoring effluent and ambient samples complied with the applicable standards as specified in Executive Order 12088 (rules, regulations, and requirements of the Department of Energy).

The data provided in this report are provided as a matter of comity and should not be construed as an application for a permit or license, or in support of such an application. Approval of the Department of Energy should be obtained prior to publication of any data contained within this report.

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Name/Org: Susan Nyle/prc Date 11/17/88
Directed by: J. A. Nesheim DOE M471.3-1

Table I. 1987 Plutonium and Uranium Airborne Effluent Data

<u>Month</u>	Plutonium		Uranium	
	<u>Release (uCi)</u>	<u>CMax (pCi/m³)</u>	<u>Release (uCi)</u>	<u>CMax (pCi/m³)</u>
CY 1986	14.33	0.047 \pm 0.0082	21.24	0.133 \pm 0.0152
January	1.39	0.095 \pm 0.0155	2.15	0.017 \pm 0.0013
February	0.89	0.071 \pm 0.0081	1.99	0.095 \pm 0.0091
March	1.79*	0.042 \pm 0.0087*	1.12	0.005 \pm 0.0004
April				
May				
June				
July				
August				
September				
October				
November				
December				
Year to Date	4.07*	0.095 \pm 0.0155*	5.26	0.095 \pm 0.0091

* Analysis incomplete.

NOTE Beginning in January 1981, the plutonium, uranium, americium, and beryllium measured concentrations have been reported. These reported concentrations include values that are less than the corresponding calculated MDC's and in some cases, values less than zero. These negative values result when the measured value for the laboratory reagent blank is subtracted from an analytical result which was measured as a smaller value than the reagent blank. This may happen when measuring concentrations which are very close to zero.

Table II. 1987 Tritium and Beryllium Airborne Effluent Data

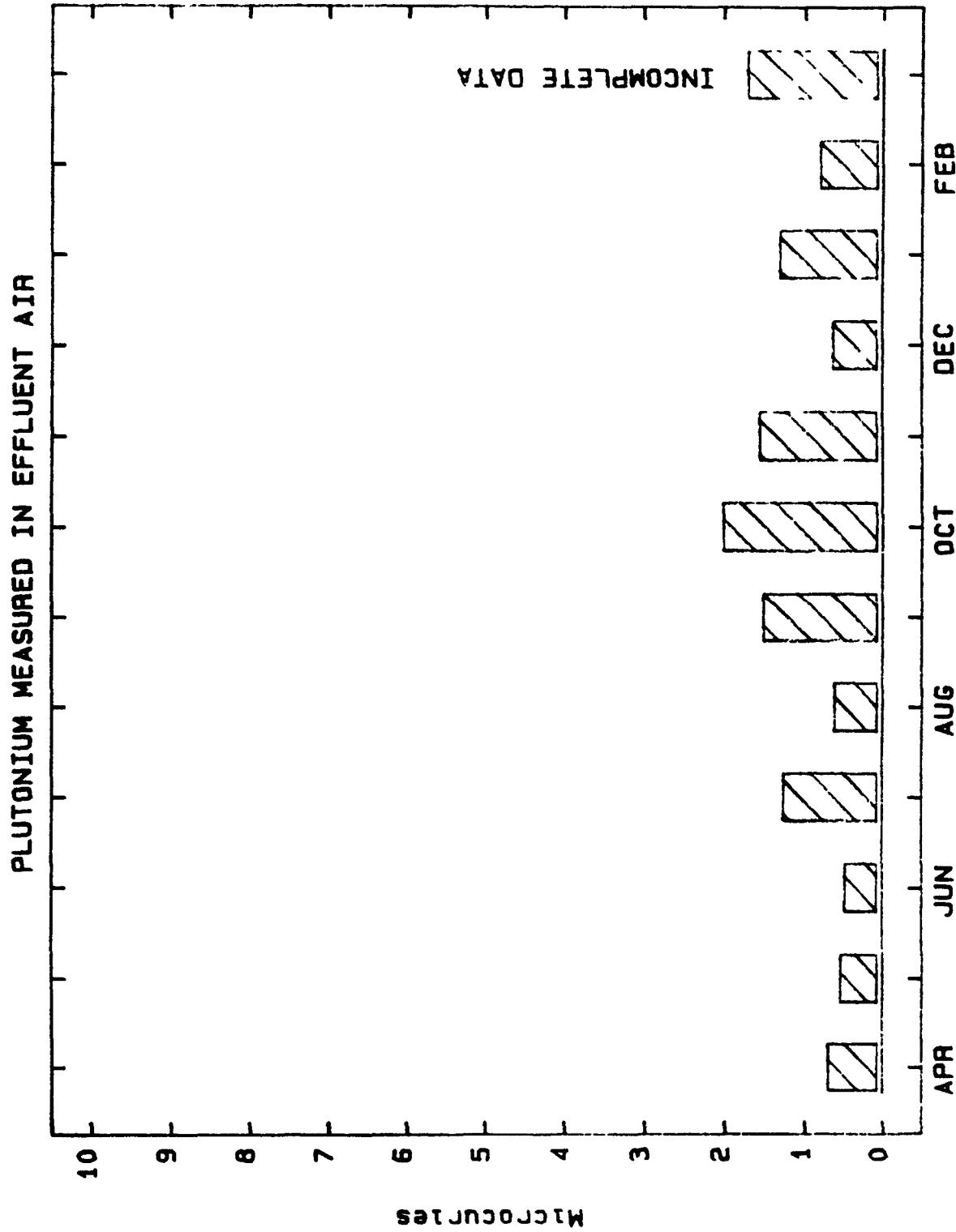
<u>Month</u>	Tritium		Beryllium	
	<u>Release (Ci)</u>	<u>CMax (pCi/m3)</u>	<u>Release (gms)</u>	<u>CMax (ug/m3)</u>
CY 1986	0.218	36700 \pm 950	0.1299	0.00053
January	0.005	410 \pm 180	0.0276	0.00042
February	0.008	250 \pm 80	0.0085	0.00006
March	0.004	470 \pm 180	0.0091	0.00014
April				
May				
June				
July				
August				
September				
October				
November				
December				
Year to Date	0.017	470 \pm 180	0.0452	0.00042

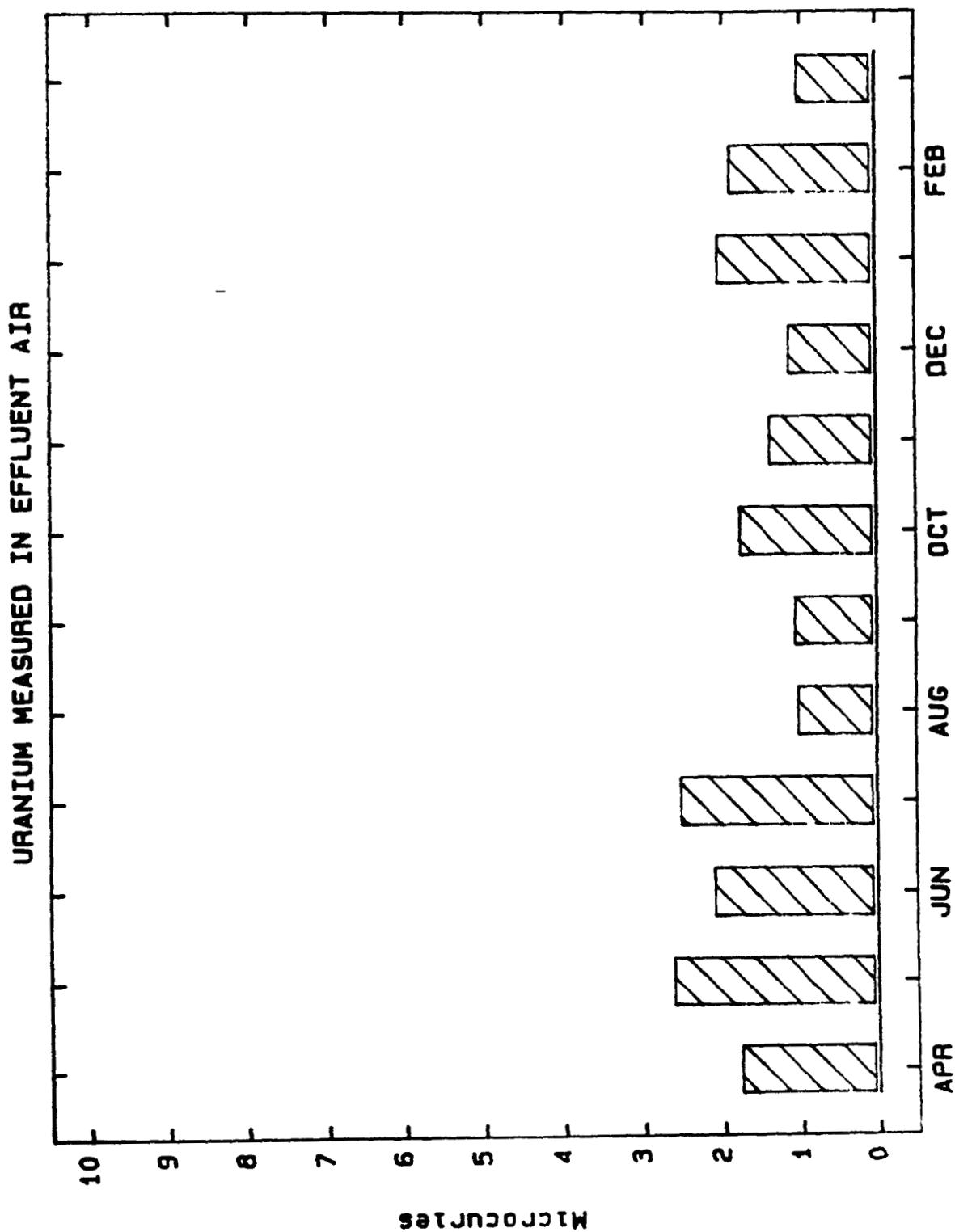
NOTE Beryllium measured at the remaining 36 locations was below the screening level of 0.1 gram per month.

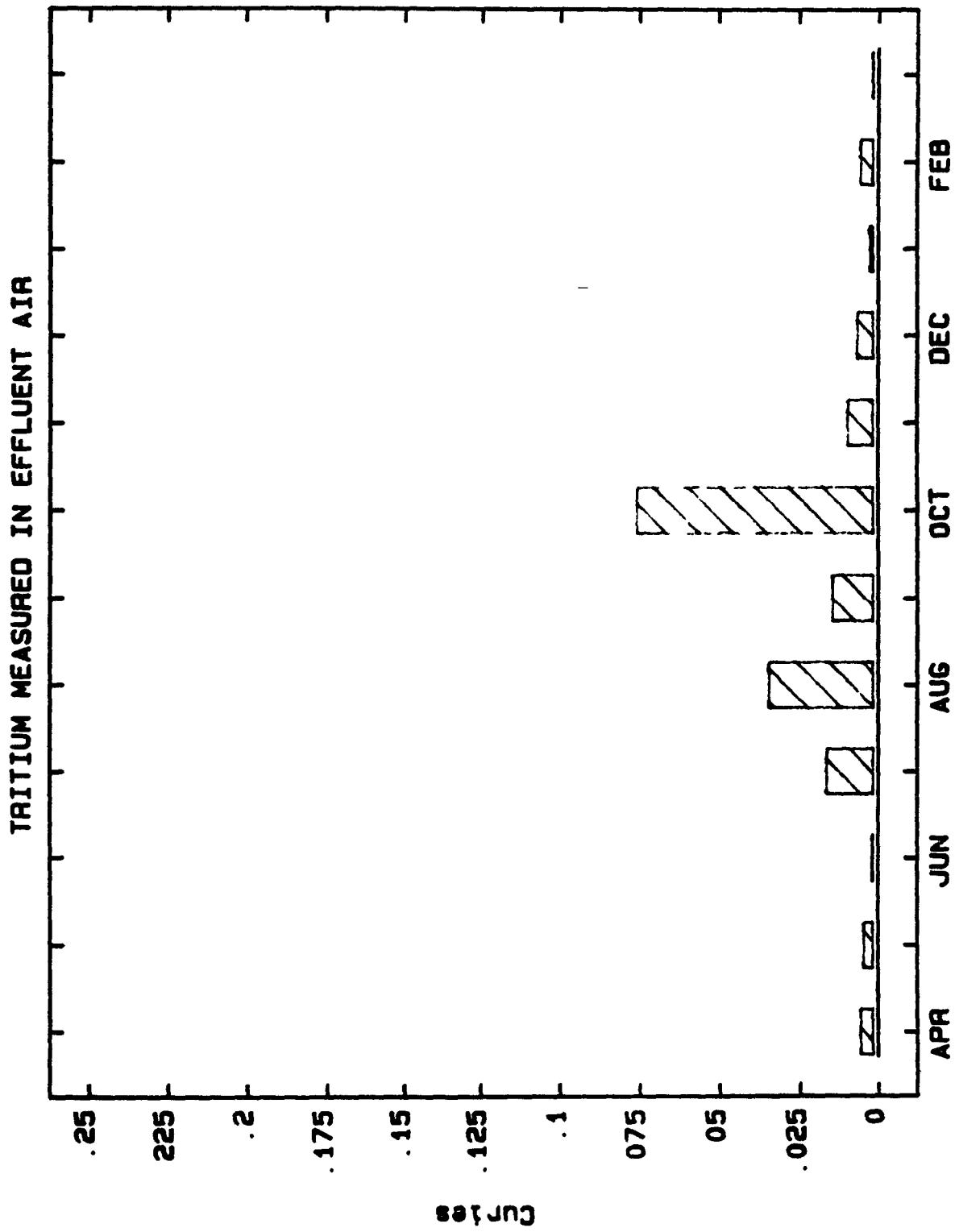
Table II. 1987 Tritium and Beryllium Airborne Effluent Data

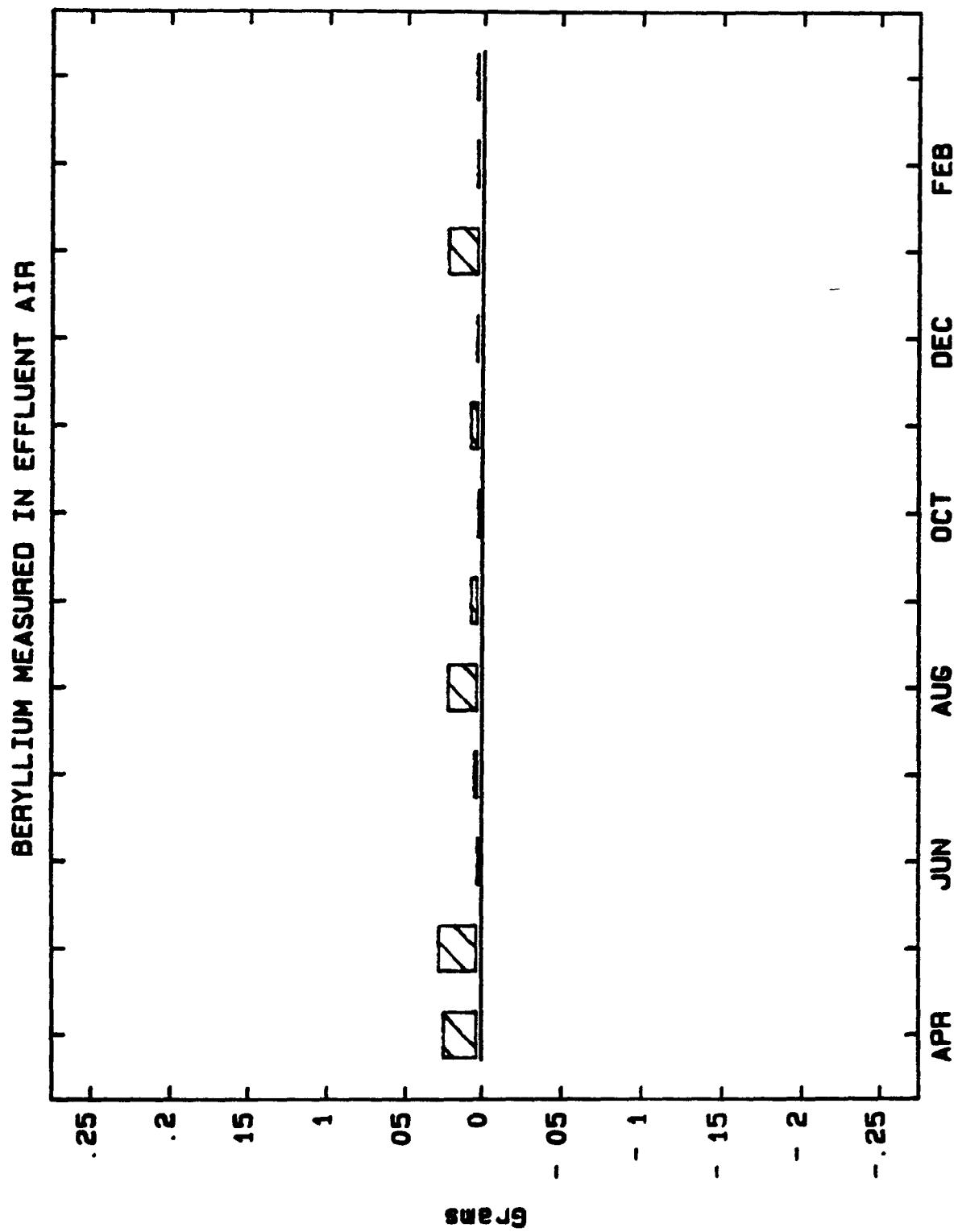
<u>Month</u>	Tritium		Beryllium	
	<u>Release (Ci)</u>	<u>CMax (pCi/m3)</u>	<u>Release (gms)</u>	<u>CMax (ug/m3)</u>
CY 1986	0.218	36700 \pm 950	0.1299	0.00053
January	0.005	410 \pm 180	0.0276	0.00042
February	0.008	250 \pm 80	0.0085	0.00006
March	0.004	470 \pm 180	0.0091	0.00014
April				
May				
June				
July				
August				
September				
October				
November				
December				
Year to Date	0.017	470 \pm 180	0.0452	0.00042

NOTE Beryllium measured at the remaining 36 locations was below the screening level of 0.1 gram per month.









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Table III. Plutonium at Selected Onsite Ambient Air Locations
(02/24/87-03/24/87)

<u>Location</u>	<u>n</u>	<u>Volume(m³)</u>	<u>Lower Confidence Limit</u>	<u>Concentration (pCi/m³)</u>	
				<u>Point Estimate</u>	<u>Upper Confidence Limit</u>
S-5	2	31,000	0.000027	0.000034	0.000041
S-6	2	28,000	0.000046	0.000055	0.000064
S-7	1	14,000	0.000064	0.000075	0.000086
S-8	2	31,000	0.000128	0.000148	0.000168
S-9	2	32,000	0.000262	0.000302	0.000342

* S-7. One sample lost due to electrical power failure.

NOTE Total long-lived alpha at the remaining 18 onsite ambient air samplers was below the screening level of 0.01 pCi/m³.

Table IV. Tritium in Ambient Air
(03/03/87 to 03/31/87)

<u>Location</u>	<u>n</u>	<u>Air Volume(m³)</u>	<u>Point Estimate (pCi/m³)</u>	<u>+/- Error (pCi/m³)</u>	<u>Condensed Water Vapor (mls)</u>
S-4	2	13	-0.01	0.98	30
S-5	4	43	-0.69	0.80	86
S-16	3	51	0.18	0.80	96

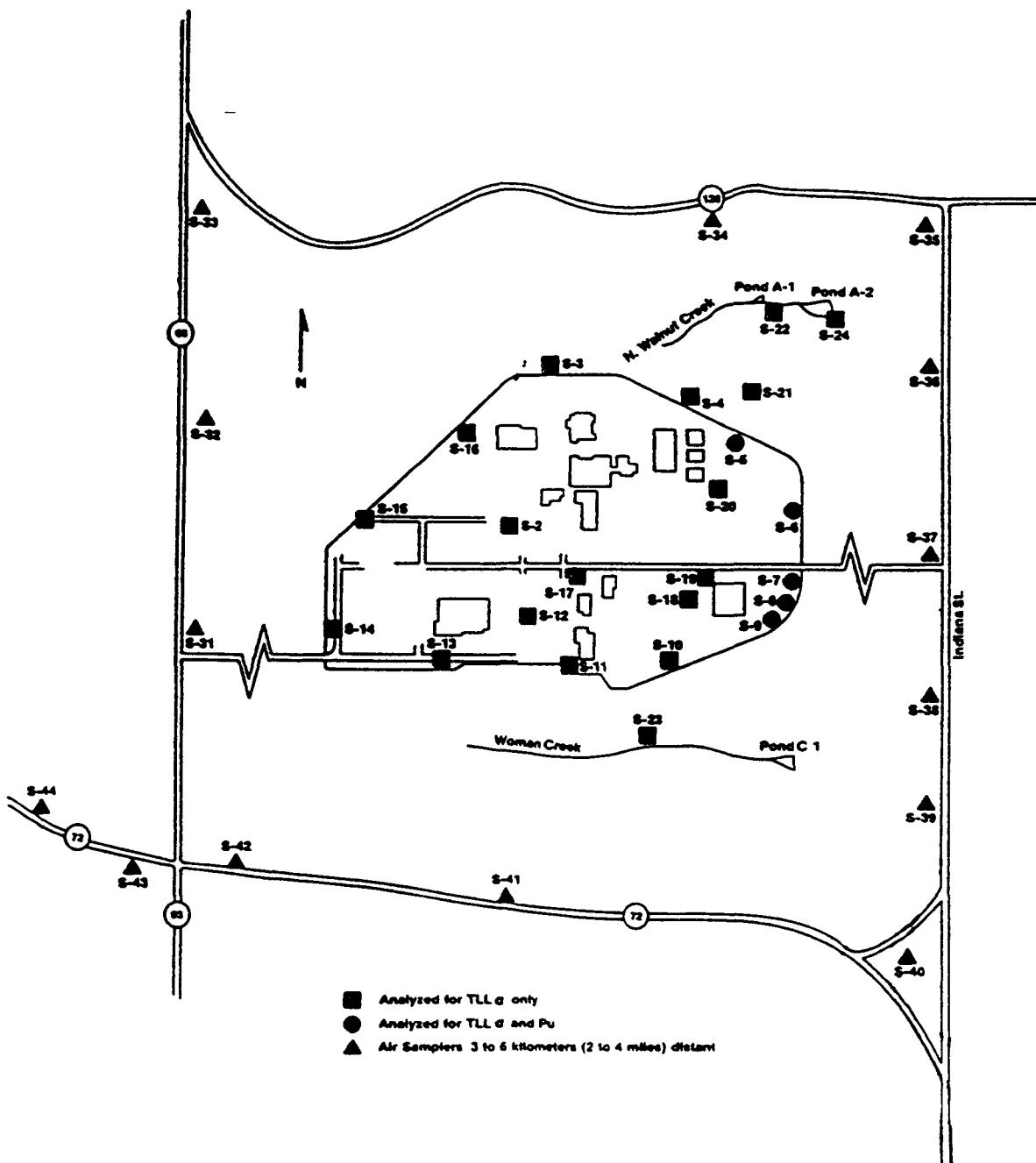
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Table V. Plutonium in Perimeter Ambient Air
(02/17/87-03/31/87)

<u>Location</u>	<u>n</u>	<u>Volume(m³)</u>	Concentration(pCi/m ³)		
			<u>Lower Confidence Limit</u>	<u>Point Estimate</u>	<u>Upper Confidence Limit</u>
S-31	1*	14,000	0.000002	0.000006	0.000010
S-32	1	40,000	0.000000	0.000001	0.000002
S-33	1	45,000	0.000002	0.000003	0.000004
S-34	1	41,000	0.000001	0.000002	0.000003
S-35	1	41,000	0.000001	0.000002	0.000003
S-36	1	39,000	0.000001	0.000003	0.000005
S-37	1	42,000	0.000006	0.000008	0.000010
S-38	1	46,000	-0.000001	0.000000	0.000001
S-39	1	47,000	-0.000002	-0.000001	0.000000
S-40	1	45,000	0.000003	0.000005	0.000007
S-41	1	43,000	-0.000001	0.000001	0.000003
S-42	1	38,000	0.000000	0.000002	0.000004
S-43	1	43,000	0.000001	0.000002	0.000003
S-44	1	33,000	0.000001	0.000003	0.000005
Mean Point Estimate =				0.000003	

* S-31 Sampler down for repairs of wind damage until 3/17/87.

Location of Onsite and Plant Perimeter Ambient Air Samplers
(Portions of figure are not to scale)

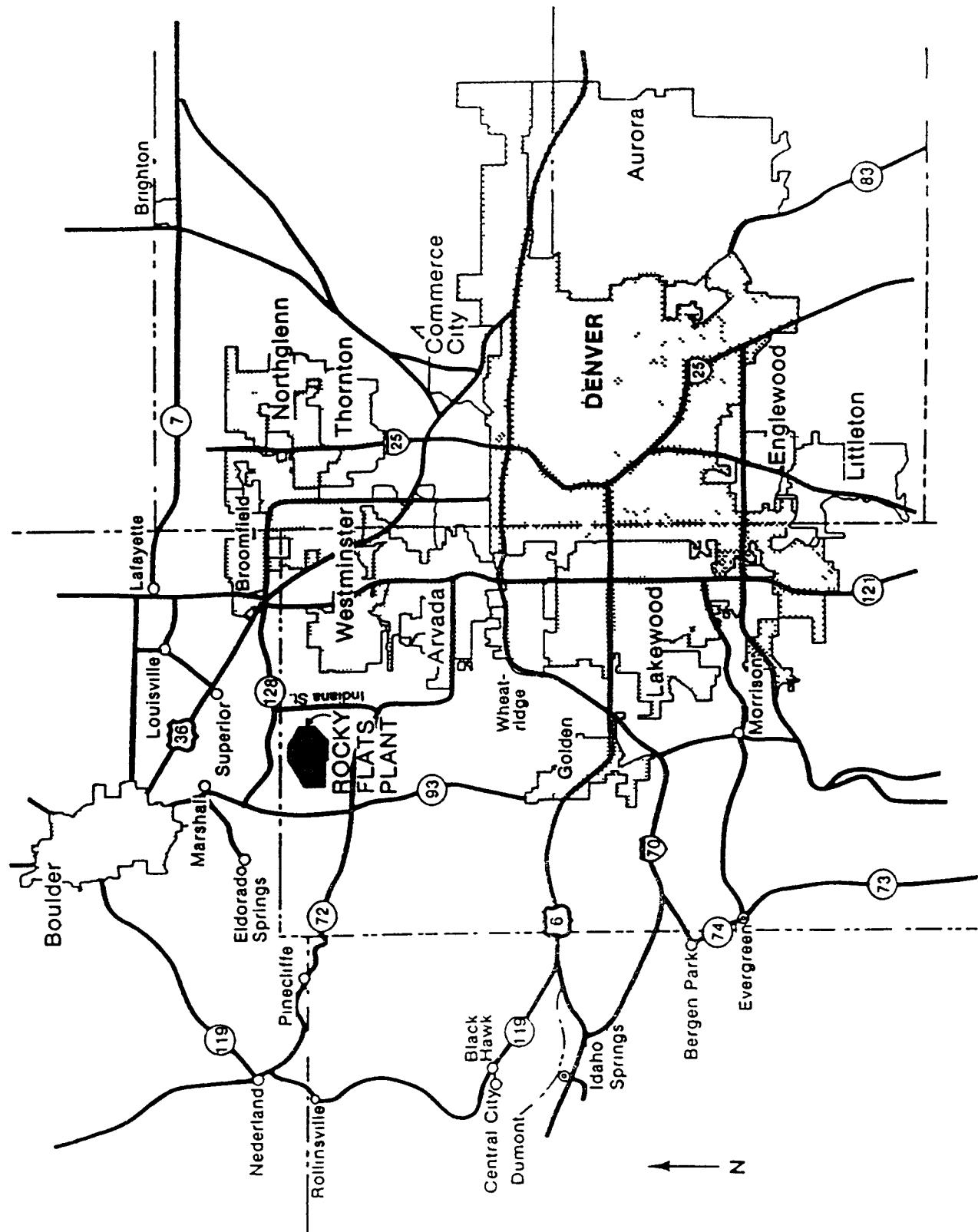


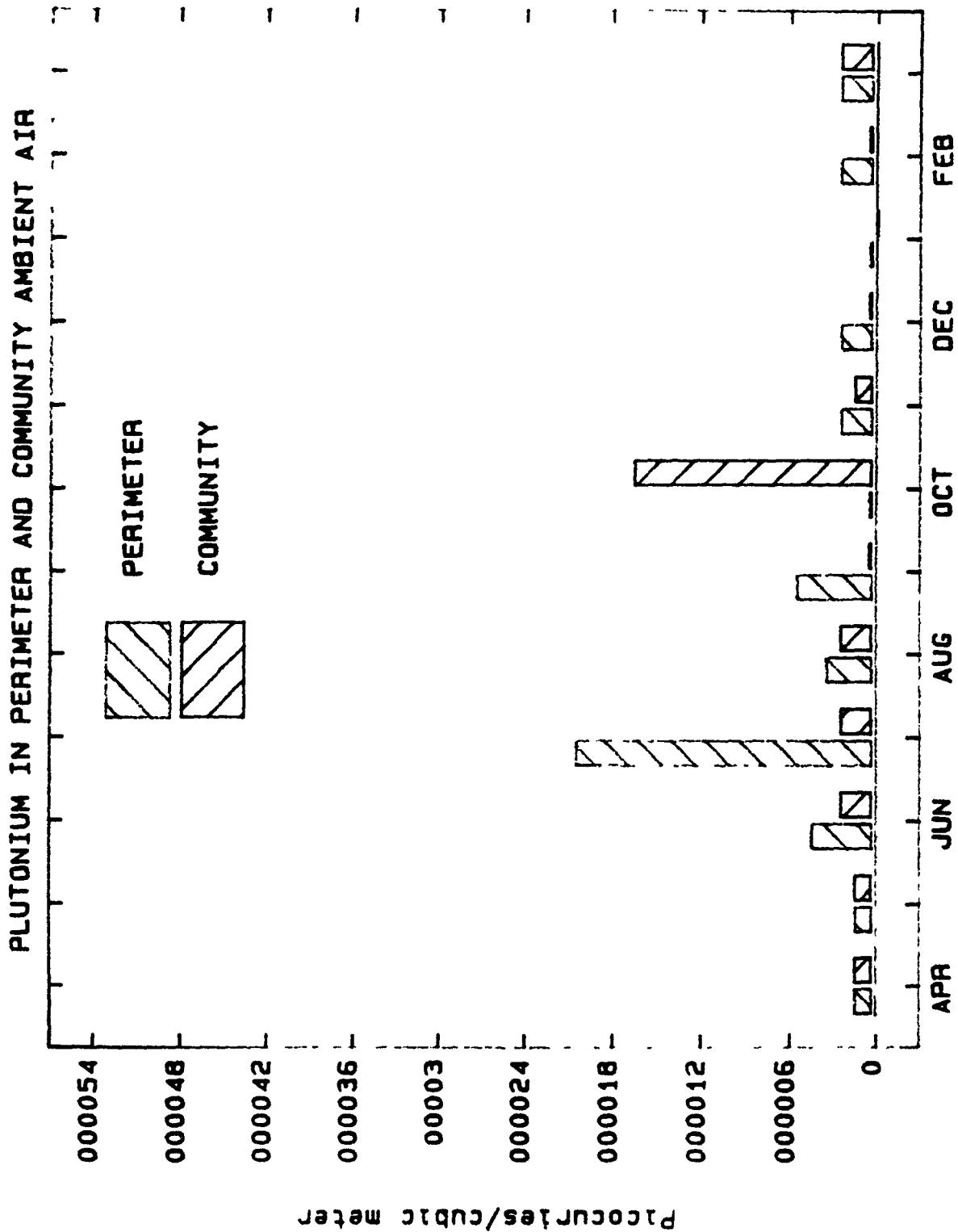
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Table VI. Plutonium in Community Ambient Air
 (02/18/87-04/01/87)

<u>Location</u>	<u>n</u>	<u>Volume(m³)</u>	Concentration(pCi/m ³)		
			<u>Lower Confidence Limit</u>	<u>Point Estimate</u>	<u>Upper Confidence Limit</u>
Marshall	1	36,000	0.000003	0.000005	0.000007
Jeffco Airport	1	40,000	0.000003	0.000004	0.000006
Superior	1	38,000	-	0.000004	0.000006
Boulder	1	47,000	0.000002	0.000004	0.000006
Lafayette	1	42,000	0.000002	0.000004	0.000006
Broomfield	1	35,000	0.000002	0.000004	0.000006
Walnut Creek	1	47,000	0.000000	0.000001	0.000002
Wagner	1	44,000	0.000001	0.000002	0.000003
Leyden	1	45,000	0.000000	0.000001	0.000002
Westminster	1	38,000	0.000002	0.000004	0.000006
Denver	1	41,000	0.000000	0.000001	0.000002
Golden	1	43,000	0.000000	0.000001	0.000002
Lakeview Pointe	1	51,000	0.000000	0.000001	0.000002
Cotton Creek	1	43,000	-0.000002	-0.000001	0.000000
Mean Point Estimate			0.000003		

Area Map of Rocky Flats Plant and Surrounding Communities





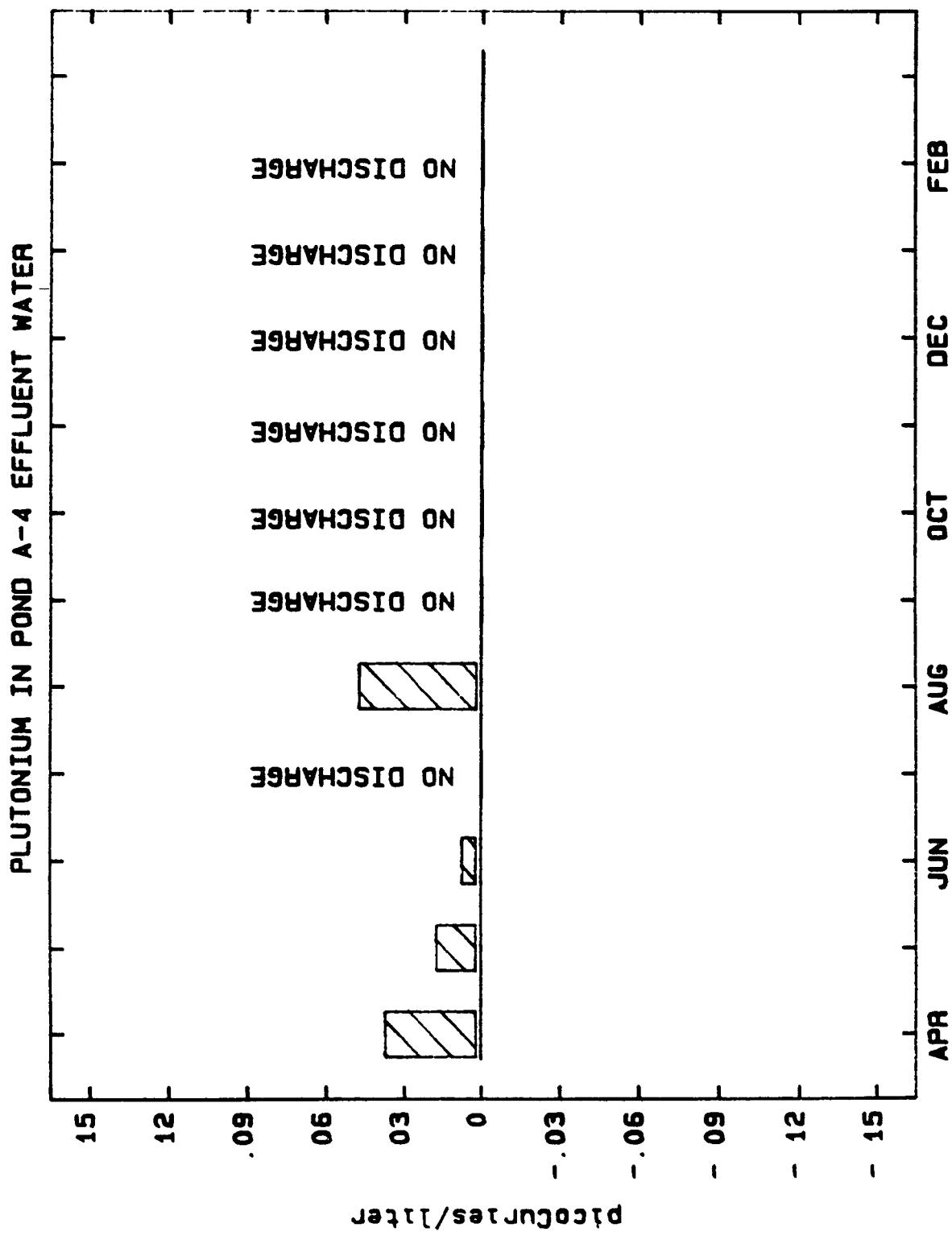
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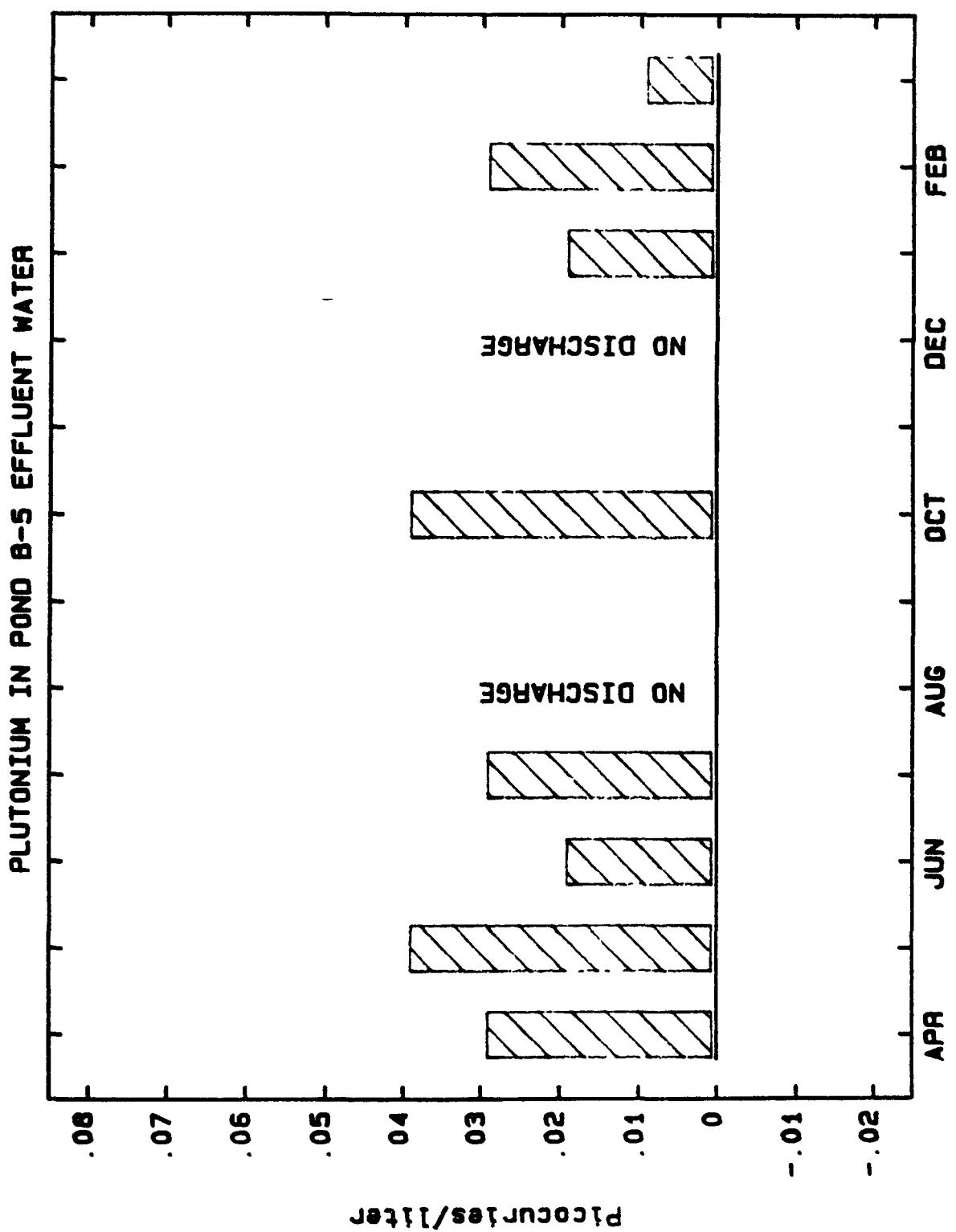
Table VII. Water Sample Results, Radioactive Parameters

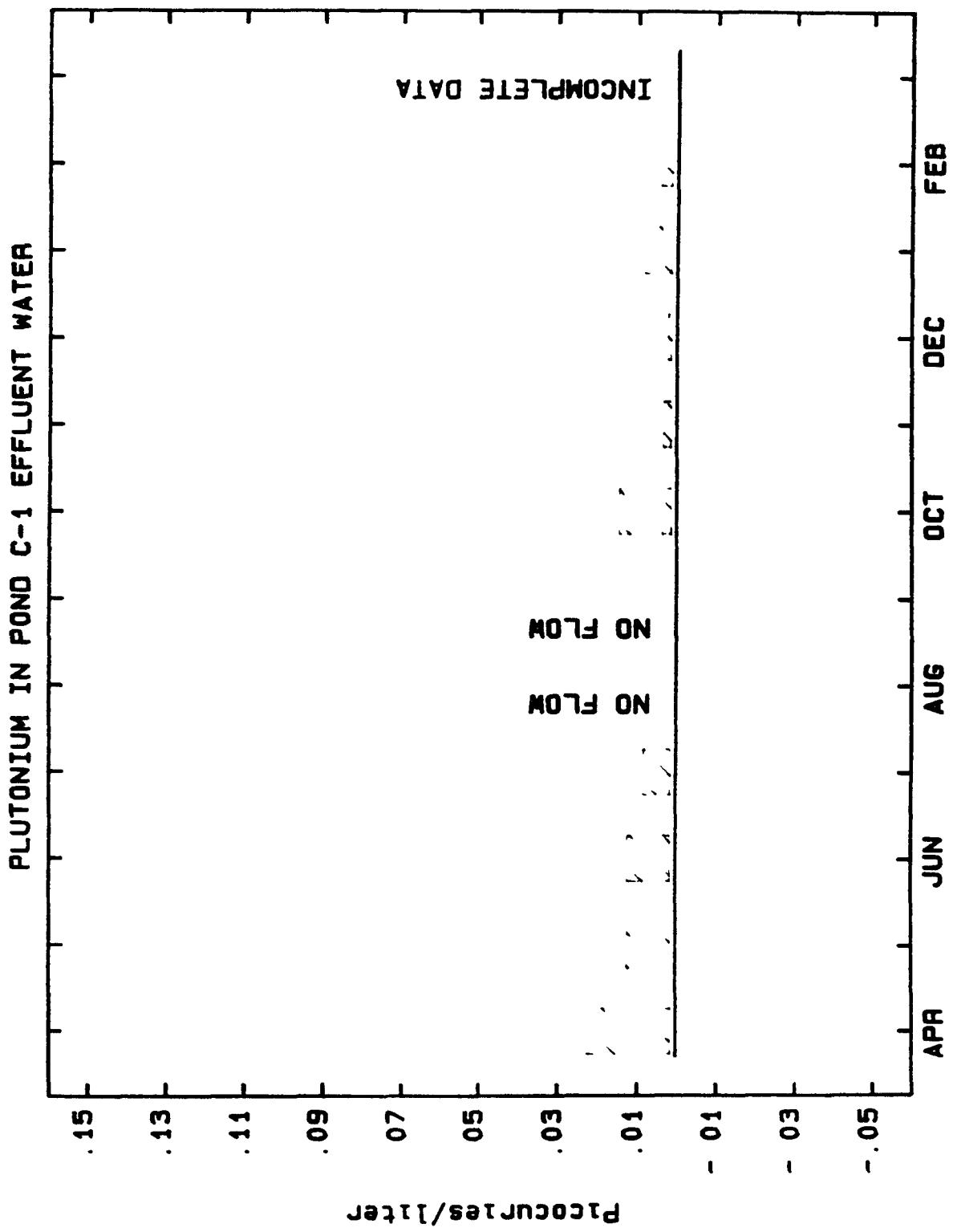
Holding Pond Outfall (pCi/l)

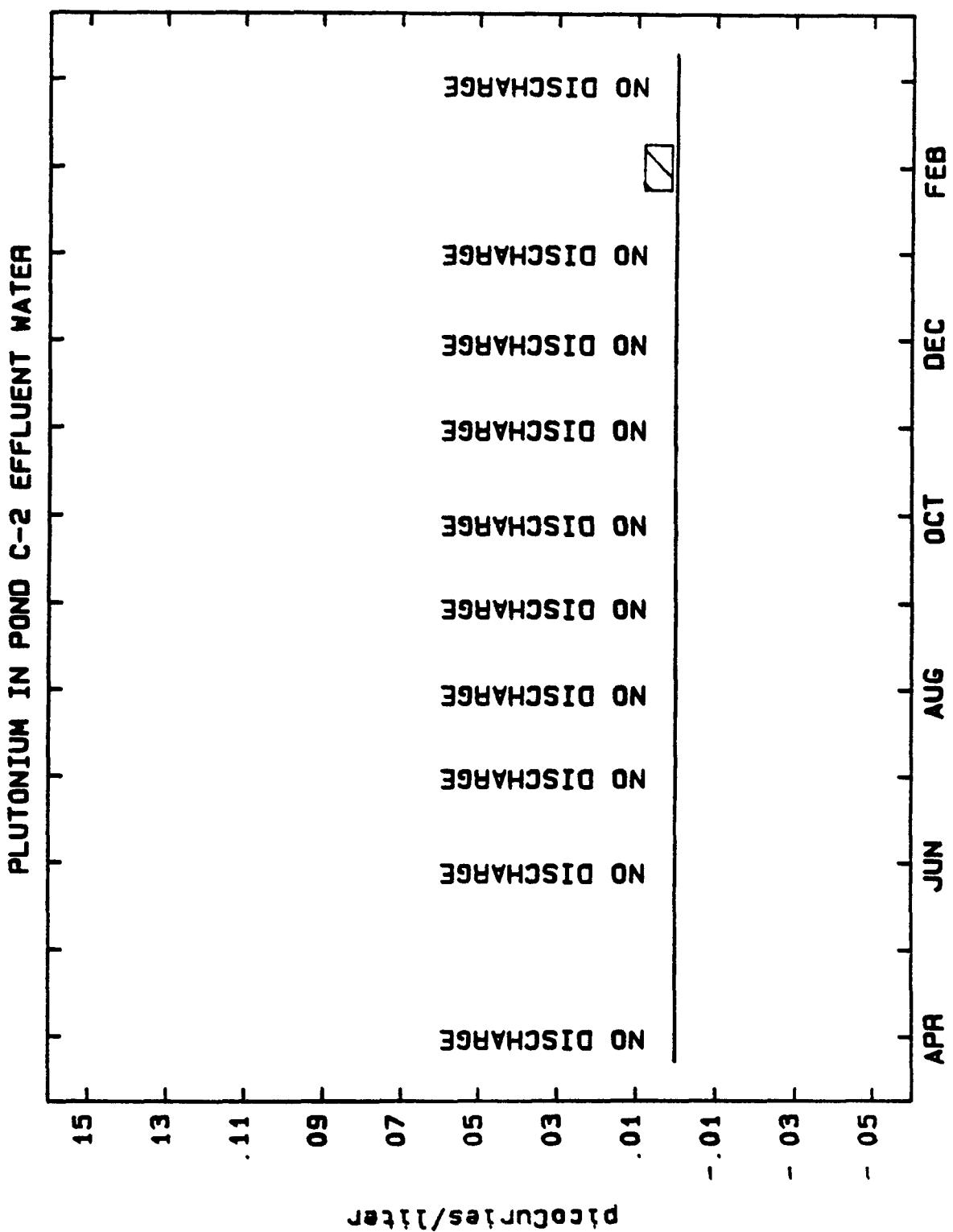
<u>Location</u>	<u>Plutonium</u>		<u>Uranium</u>		<u>Americium</u>	
<u>Pond A-4</u>						
03/17/87 - 03/20/87	0.01	<u>+ 0.04</u>	25	<u>+ 3</u>	0.03	<u>+ 0.02</u>
03/24/87 - 03/25/87	0.00	<u>± 0.02</u>	22	<u>± 2</u>	0.02	<u>± 0.02</u>
Average Concentration	0.00	<u>± 0.02</u>	24	<u>± 2</u>	0.02	<u>± 0.01</u>
<u>Pond B-5</u>						
03/17/87 - 03/20/87	0.01	<u>+ 0.02</u>	5.0	<u>+ 0.5</u>	0.02	<u>+ 0.02</u>
03/24/87 - 03/26/87	0.01	<u>± 0.02</u>	5.9	<u>± 0.9</u>	0.00	<u>± 0.01</u>
Average Concentration	0.01	<u>± 0.01</u>	5.4	<u>± 0.5</u>	0.01	<u>± 0.01</u>
<u>Pond C-1</u>						
02/27/87 - 03/06/87	0.020	<u>+ 0.006</u>	0.3	<u>+ -0.1</u>	0.01	<u>+ 0.01</u>
03/06/87 - 03/13/87	*		0.8	<u>± 0.2</u>	*	
03/13/87 - 03/20/87	0.003	<u>+ 0.005</u>	0.6	<u>± 0.1</u>	0.001	<u>+ 0.003</u>
03/20/87 - 03/27/87	0.02	<u>± 0.01</u>	1.0	<u>± 0.1</u>	0.004	<u>± 0.003</u>
Average Concentration	*		0.7	<u>± 0.1</u>	*	
<u>Pond C-2</u>						
NO DISCHARGE						
<u>Walnut Creek at Indiana</u>						
02/27/87 - 03/06/87	0.000	<u>+ 0.004</u>	6.6	<u>+ 0.6</u>	0.00	<u>+ 0.01</u>
03/06/87 - 03/13/87	0.003	<u>± 0.005</u>	2.9	<u>± 0.4</u>	-0.02	<u>± 0.05</u>
03/13/87 - 03/20/87	0.02	<u>± 0.02</u>	13	<u>± 2</u>	0.03	<u>± 0.01</u>
03/20/87 - 03/27/87	0.007	<u>± 0.005</u>	5.2	<u>± 0.5</u>	0.011	<u>± 0.004</u>
Average Concentration	0.008	<u>± 0.005</u>	6.9	<u>± 0.5</u>	0.00	<u>± 0.01</u>

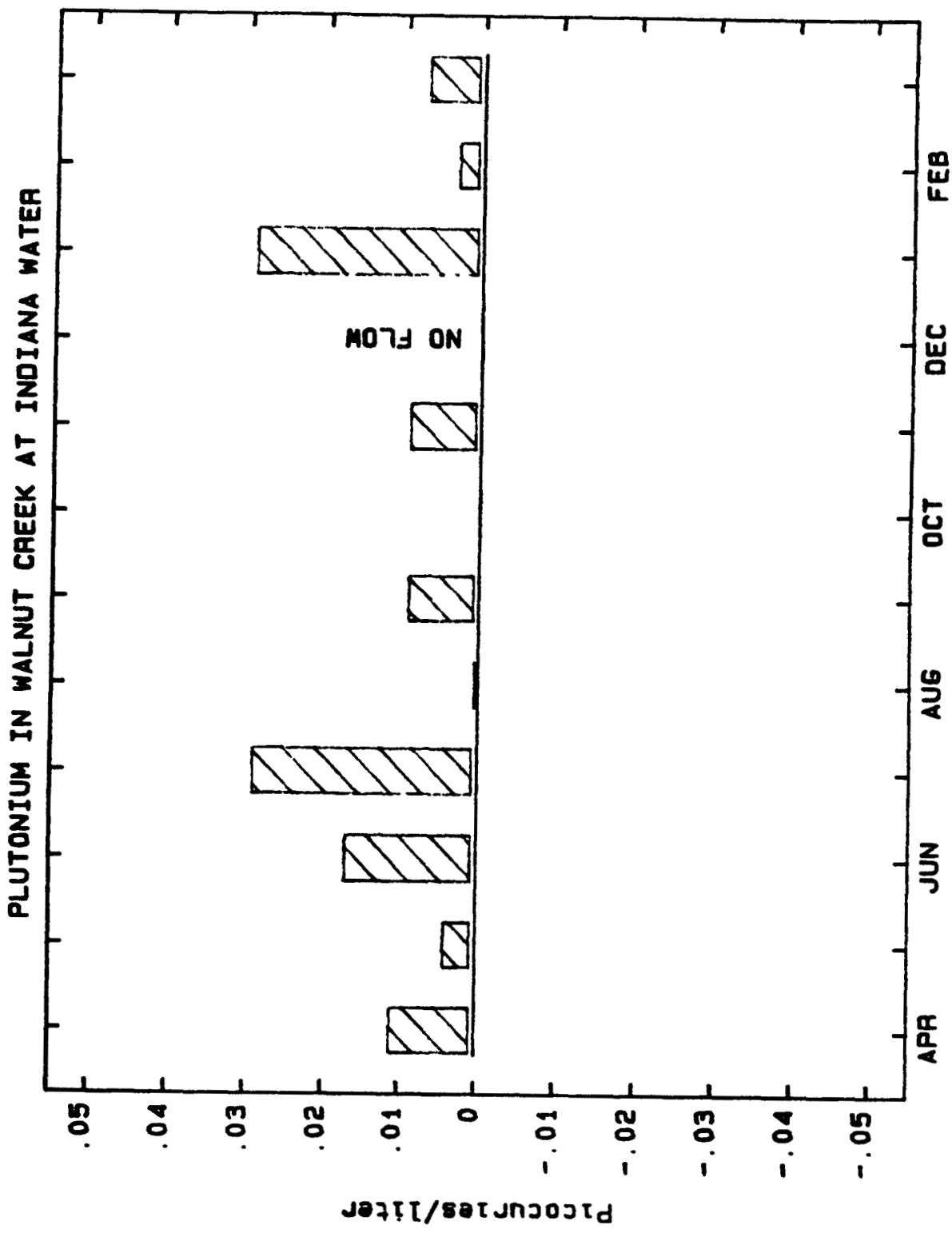
* Analysis incomplete.











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Table VIII. Water Sample Results, Radioactive Parameters

Reservoirs (pCi/l)

<u>Location</u>	<u>n</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
Great Western	1*	0.006 + 0.005	2.2 + 0.2	0.003 + 0.004
Standley	1*	0.001 + 0.006	1.9 + 0.2	0.005 + 0.003

Community Tap Water (pCi/l)

<u>Location</u>	<u>n</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
Arvada	1*	0.00 + 0.01	0.2 + 0.1	0.01 + 0.01
Boulder	1*	-0.001 + 0.005	0.03 + 0.06	0.004 + 0.004
Broomfield	1*	0.000 + 0.005	1.6 + 0.2	0.000 + 0.003
Denver	1	-0.01 + 0.02	1.4 + 0.2	0.00 + 0.05
Golden	1	0.01 + 0.02	1.8 + 0.3	0.00 + 0.05
Lafayette	1	0.00 + 0.02	0.1 + 0.1	0.00 + 0.06
Louisville	1	0.00 + 0.02	0.0 + 0.1	0.00 + 0.05
Thornton	1	-0.01 + 0.02	1.1 + 0.2	-0.01 + 0.05
Westminster	1*	0.001 + 0.006	0.5 + 0.1	0.002 + 0.004

* Plutonium, uranium and americium analyses were performed on one sample composited from four weekly grab samples. All other analyses were performed on quarterly grab samples.

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Table IX. Water Sample Results, Radioactive Parameters

Tritium (pCi/l)

<u>Location</u>	<u>n</u>	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
Pond A-4	5	-700 \pm 400	400 \pm 400	0 \pm 200
Pond B-5	6	-600 \pm 400	600 \pm 400	300 \pm 200
Pond C-1	5	100 \pm 400	800 \pm 500	400 \pm 200
Pond C-2	0	No Discharge		
Walnut Creek at Indiana	5	-200 \pm 400	900 \pm 400	200 \pm 200
Arvada	1	0 \pm 400	0 \pm 400	0 \pm 400
Boulder	4	-100 \pm 400	300 \pm 400	100 \pm 200
Broomfield	4	-100 \pm 400	600 \pm 400	300 \pm 200
Denver	1	0 \pm 400	0 \pm 400	0 \pm 400
Golden	1	-300 \pm 400	-300 \pm 400	-300 \pm 400
Great Western	4	-300 \pm 400	500 \pm 400	100 \pm 200
Lafayette	1	100 \pm 400	100 \pm 400	100 \pm 400
Louisville	1	0 \pm 400	0 \pm 400	0 \pm 400
Standley	4	100 \pm 400	500 \pm 400	300 \pm 200
Thornton	1	100 \pm 400	100 \pm 400	100 \pm 400
Westminster	4	100 \pm 400	400 \pm 400	200 \pm 200

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Table X. Water Sample Results, Nonradioactive Parameters

Nitrate (as N) at Great Western Reservoir

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
03/05/87	<0.2
03/12/87	<0.2
03/19/87	<0.2
03/26/87	0.2

Nitrate (as N) at Standley Lake

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
03/05/87	<0.2
03/12/87	<0.2
03/19/87	0.3
03/26/87	<0.2

NOTE. For some parameters, the concentrations that are measured at or below the minimum detectable concentration (MDC) are assigned to MDC. The less than symbol (<) indicated MDC values and calculated values that include one or more MDC's.

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Table XI. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)
Discharged 11 times

<u>Parameter</u>		<u>30-Day Average</u>	<u>Limits 30-Day*</u>	<u>Daily Average</u>	<u>Limits Daily Maximum</u>
Biochem. Oxygen Demand, 5 Day	mg/l	7.3	10	11.	25
Total Suspended Solids	mg/l	9.5	30	26.	NA
Nitrates as N	mg/l	<0.4	10	1.0	NA
Total Chromium	mg/l	<0.05	0.05	<0.05	0.1
Total Phosphorus	mg/l	1.5	8	2.3	12
Oil and Grease, Visual		none	NA	none	NA
Total Residual Chlorine	mg/l	0.06	NA	0.2	0.5
Fecal Coliforms	#/100 ml	1.0	200	2.8	NA
pH	S.U.	7.1	Minimum 6.0	Maximum 7.5	Maximum 9.0

Discharge 002 (Pond A-3)
Discharged six times

<u>Parameters</u>		<u>30-Day Average</u>	<u>Limits 30-Day*</u>	<u>Daily Maximum</u>	<u>Limits Daily Maximum</u>
Nitrates as N	mg/l	3.2	10	4.2	20
pH	S.U.	7.3	Minimum 6.0	Maximum 8.0	Maximum 9.0

Discharge 003 (RO Pilot Plant)

<u>No Discharge</u>		<u>Limits</u>	<u>Limits</u>
pH	S.U.	Minimum No Discharge 6.0	Maximum 9.0

Discharge 004 (RO Plant)

<u>No Discharge</u>		<u>Limits</u>	<u>Limits</u>
Total Suspended Solids	mg/l	30-Day Average No Discharge 15	Daily Maximum 25
Total Organic Compounds	mg/l	22	30
Total Phosphorus	mg/l	8	12
Nitrates as N	mg/l	10	20
Total Chromium	mg/l	0.05	0.1
Total Residual Chlorine	mg/l	NA	0.5
Fecal Coliform	#/100 ml	7-Day Average 400	30-Day Average 200

<u>pH</u>	<u>S.U.</u>	<u>Minimum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Maximum</u>
		6.0		9.0	

* This limitation applies when a minimum of 3 consecutive samples are taken during separate weeks.

Tables XI. NPDES Permit Water Sample Results (Continued)

Discharge 005 (Pond A-4)

<u>Parameter</u>		<u>n</u>	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
pH	S.U.	5	7.5	8.4	-
Nitrates as N	mg/l	5	1.3	5.1	2.7
Nonvolatile	mg/l	5	0.0	6.0	2.8
Suspended Solids					

Discharge 006 (Pond B-5)

<u>Parameter</u>		<u>n</u>	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
pH	S.U.	5	7.4	8.2	-
Nitrates as N	mg/l	5	0.8	2.0	1.5
Nonvolatile	mg/l	5	1.0	10.	6.6
Suspended Solids					

Discharge 007 (Pond C-2)

No Discharge

<u>Parameter</u>		<u>n</u>	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
pH	S.U.			No Discharge	
Nitrates as N	mg/l				
Nonvolatile	mg/l				
Suspended solids					

Table XII. Nonradioactive Water Sample Results

Walnut Creek at Indiana Street

<u>Parameter</u>		<u>n</u>	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
pH	S.U.	21	7.0	8.7	-
Nitrates as N	mg/l	21	0.2	9.0	1.0

Total Volume (gallons) = 101,669,000

Table XII.

Daily Flow Data Recorded at the
Walnut Creek at Indiana Gauging Station,
Ponds A-4 and B-5 during March, 1987

<u>Date</u>	<u>Walnut Creek at Indiana (gallons)</u>	<u>Pond A-4 (gallons)</u>	<u>Pond B-5 (gallons)</u>
3/03/87	-	-	-
3/04/87	996,000	-	-
3/05/87	1,558,000	-	-
3/06/87	2,347,000	-	-
3/09/87	3,592,000	-	-
3/10/87	1,020,000	-	-
3/11/87	2,020,000	-	-
3/12/87	1,266,000	-	-
3/13/87	419,000	-	-
3/16/87	2,769,000	-	-
3/17/87	8,806,000	2,710,000	2,007,000
3/18/87	8,908,000	2,600,000	2,469,000
3/19/87	6,275,000	2,721,000	-
3/20/87	10,141,000	5,087,000	2,584,000
3/23/87	12,106,000	-	-
3/24/87	12,801,000	3,489,000	2,047,000
3/25/87	6,649,000	-	1,554,000
3/26/87	3,421,000	-	-
3/27/87	3,727,000	-	-
3/30/87	9,577,000	-	-
3/31/87	3,271,000	-	-
Total Volume	101,669,000	16,607,000	10,661,000

Table XIII.
Daily Flow Data Recorded at
Ponds C-1 and C-2 during March, 1987

<u>Date</u>	Pond C-1 (gallons)	Pond C-2 (gallons)
3/03/87	634,000	-
3/04/87	796,000	-
3/05/87	578,000	-
3/06/87	692,000	-
3/09/87	2,142,000	-
3/10/87	715,000	-
3/11/87	721,000	-
3/12/87	580,000	-
3/13/87	698,000	-
3/16/87	2,200,000	-
3/17/87	682,000	-
3/18/87	675,000	-
3/19/87	603,000	-
3/20/87	690,000	-
3/23/87	2,128,000	-
3/24/87	760,000	-
3/25/87	602,000	-
3/26/87	712,000	-
3/27/87	698,000	-
3/30/87	2,082,000	-
3/31/87	770,000	-
Total Volume	20,158,000	-